

I Claim:

1           1.    A manual fluid control system for surgical lasers and  
2   electrosurgery apparatus, for both open and laparoscopic  
3   procedures, comprising, in combination:

4               at least one fluid irrigation container;

5               an irrigation tubing connected to said at least one  
6   fluid irrigation container;

7               a valve connected to the irrigation tubing for  
8   accessing irrigation fluid in said at least one fluid irrigation  
9   container;

10              means for pumping said irrigation fluid through the  
11   irrigation tubing to a surgery site in a patient;

12              a suction tubing connected to a suction container; and

13              means for suctioning fluid from the patient at the  
14   surgery site through the suctioning tube.

1           2.    The manual fluid control system of Claim 1 wherein the  
2   suction and irrigation tubings are contained within, and  
3   connected to, a surgical pencil such that suction and irrigation  
4   at the surgery site occurs at a tip of the surgical pencil.

1           3.    The manual fluid control system of Claim 1 further  
2    comprising a fluid sensor surrounding a portion of the irrigation  
3    tubing for detecting the presence of irrigation fluid within the  
4    irrigation tubing.

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1           4.    The manual fluid control system of Claim 3 further  
2    comprising a safety relay which shuts off said pumping means when  
3    irrigation fluid is not present in the irrigation tubing.

1           5.    The manual fluid control system of Claim 1 wherein said  
2    suctioning means comprises at least one of an independent  
3    suctioning means and a suctioning means contained within an  
4    automatic smoke evacuator system.

1           6.    The manual fluid control system of Claim 1 further  
2    comprising a pressure sensor connected to said irrigation tubing  
3    prior to a point of delivery within the patient.

1           7.    The manual fluid control system of Claim 6 further  
2    comprising a pressure controller connected to said pressure  
3    sensor which shuts off said pumping means when fluid pressure  
4    reaches a predetermined unsafe level.

1           8.    The manual fluid control system of Claim 1 further  
2    comprising a second fluid irrigation container connected to a  
3    second irrigation tubing having a second valve for accessing  
4    irrigation fluid in the second fluid irrigation container wherein  
5    the first and second irrigation tubings are connected to a "Y"  
6    connector at a point subsequent to the attachment of their  
7    respective valves thereby resulting in a single irrigation  
8    conduit.

1           (9.)   The manual fluid control system of Claim 8, further  
2    comprising a container controller connected to the safety relay  
3    which, upon failure to detect irrigation fluid within the first  
4    irrigation tubing by the fluid sensor, closes the valve connected  
5    to the first irrigation tubing and opens the second valve to  
6    access irrigation fluid contained within the second fluid  
7    irrigation container.

1           (10.)   The manual fluid control system of Claim 9, further  
2    comprising an alarm element connected to the container controller  
3    which activates at least one of a voice and warning signal  
4    indicating that the fluid irrigation container presently in use

5 is empty.

1 11. The manual fluid control system of Claim 1, further  
2 comprising a vacuum sensor connected to said suction tubing  
3 wherein said vacuum sensor comprises means for disconnecting said  
4 suctioning means and said pumping means upon detection of an  
5 unsafe vacuum pressure.

1 12. An automatic fluid control system for surgical lasers  
2 and electrosurgery apparatus, for both open and laparoscopic  
3 procedures, comprising, in combination:  
4 at least one fluid irrigation container;  
5 at least one irrigation tubing connected to said at  
6 least one fluid irrigation container;  
7 at least one valve connected to said at least one  
8 irrigation tubing for accessing irrigation fluid in said at least  
9 one fluid irrigation container;  
10 means for employing a surgical device;  
11 means for irrigating said irrigation fluid through the  
12 irrigation tubing to a site of the surgical device wherein the  
13 means for irrigating is connected to said means for employing a  
14 surgical device such that said irrigating means is activated upon

15 deactivation of said surgical device;

16 a suction tubing connected to a suction container; and  
17 means for suctioning fluid from within a patient  
18 through the suction tubing at the site of the surgical device  
19 wherein the suctioning means is connected to the irrigating means  
20 such that said suctioning means is activated upon deactivation of  
21 said irrigation means.

1 13. The automatic fluid control system of Claim 12 wherein  
2 the suction and irrigation tubings are contained within, and  
3 connected to, a surgical pencil such that suction and irrigation  
4 occurs at a tip of the surgical pencil where at least one of  
5 surgical cutting and coagulation takes place.

1 14. The automatic fluid control system of Claim 12 further  
2 comprising a fluid sensor surrounding a portion of the irrigation  
3 tubing for detecting the presence of irrigation fluid within the  
4 irrigation tubing.

1 15. The automatic fluid control system of Claim 14 further  
2 comprising a safety relay which shuts off said irrigation means  
3 when irrigation fluid is not present in the irrigation tubing.

1 16. The automatic fluid control system of Claim 12 wherein  
2 said suctioning means comprises at least one of an independent  
3 suctioning means and a suctioning means contained within an  
4 automatic smoke evacuator system.

1 17. The automatic fluid control system of Claim 12 further  
2 comprising a pressure sensor connected to said irrigation tubing  
3 prior to a point of delivery within the patient.

1 18. The automatic fluid control system of Claim 17 further  
2 comprising a pressure controller connected to said pressure  
3 sensor which shuts off said irrigation means when fluid pressure  
4 reaches a predetermined unsafe level.

1 19. The automatic fluid control system of Claim 12 further  
2 comprising a second fluid irrigation container connected to a  
3 second irrigation tubing having a second valve for accessing  
4 irrigation fluid in the second fluid irrigation container wherein  
5 the first and second irrigation tubings are connected to a "Y"  
6 connector at a point subsequent to the attachment of their  
7 respective valves thereby resulting in a single irrigation

8 conduit.

1 20. The automatic fluid control system of Claim 19 further  
2 comprising a container controller connected to the safety relay  
3 which, upon failure to detect irrigation fluid within the first  
4 irrigation tubing by the fluid sensor, closes the valve connected  
5 to the first irrigation tubing and opens the second valve to  
6 access irrigation fluid contained within the second fluid  
7 irrigation container.

1 21. The automatic fluid control system of Claim 20 further  
2 comprising an alarm element connected to the container controller  
3 which activates at least one of a voice and warning signal  
4 indicating that the fluid irrigation container presently in use  
5 is empty.

1 22. An automatic fluid control system for surgical lasers  
2 and electrosurgery apparatus, for both open and laparoscopic  
3 procedures, comprising, in combination:

4 at least one fluid irrigation container;

5 at least one irrigation tubing connected to said at  
6 least one fluid irrigation container;

7 at least one valve connected to said at least one  
8 irrigation tubing for accessing irrigation fluid in said at least  
9 one fluid irrigation container;

10 means for employing a surgical device;

11 means for irrigating said irrigation fluid through the  
12 irrigation tubing to a site of the surgical device wherein the  
13 means for irrigating is connected to said means for employing a  
14 surgical device such that said irrigating means is activated upon  
15 deactivation of said surgical device;

16 a suction tubing connected to a suction container; and

17 means for suctioning fluid from within a patient  
18 through the suction tubing at the site of the surgical device  
19 wherein the suctioning means is connected to the irrigating means  
20 such that said suctioning means is activated upon activation of  
21 said irrigating means and said suction means is deactivated at a  
22 short predetermined time following deactivation of said  
23 irrigation means.

1 23. The automatic fluid control system of Claim 22 wherein  
2 the suction and irrigation tubings are contained within, and  
3 connected to, a surgical pencil such that suction and irrigation  
4 occurs at a tip of the surgical pencil where at least one of



5 surgical cutting and coagulation takes place.

1 24. The automatic fluid control system of Claim 22 further  
2 comprising a fluid sensor surrounding a portion of the irrigation  
3 tubing for detecting the presence of irrigation fluid within the  
4 irrigation tubing.

1 25. The automatic fluid control system of Claim 24 further  
2 comprising a safety relay which shuts off said irrigation means  
3 when irrigation fluid is not present in the irrigation tubing.

1 26. The automatic fluid control system of Claim 22 wherein  
2 said suctioning means comprises at least one of an independent  
3 suctioning means and a suctioning means contained within an  
4 automatic smoke evacuator system.

1 27. The automatic fluid control system of Claim 22 further  
2 comprising a pressure sensor connected to said irrigation tubing  
3 prior to a point of delivery within the patient.

1 28. The automatic fluid control system of Claim 27 further  
2 comprising a pressure controller connected to said pressure

3 sensor which shuts off said irrigation means when fluid pressure  
4 reaches a predetermined unsafe level.

1 29. The automatic fluid control system of Claim 22 further  
2 comprising a second fluid irrigation container connected to a  
3 second irrigation tubing having a second valve for accessing  
4 irrigation fluid in the second fluid irrigation container wherein  
5 the first and second irrigation tubings are connected to a "Y"  
6 connector at a point subsequent to the attachment of their  
7 respective valves thereby resulting in a single irrigation  
8 conduit.

1 30. The automatic fluid control system of Claim 29 further  
2 comprising a container controller connected to the safety relay  
3 which, upon failure to detect irrigation fluid within the first  
4 irrigation tubing by the fluid sensor, closes the valve connected  
5 to the first irrigation tubing and opens the second valve to  
6 access irrigation fluid contained within the second fluid  
7 irrigation container.

1 31. The automatic fluid control system of Claim 30 further  
2 comprising an alarm element connected to the container controller

3 which activates at least one of a voice and warning signal  
4 indicating that the fluid irrigation container presently in use  
5 is empty.

1 32. An automatic fluid control system for surgical lasers  
2 and electrosurgery apparatus, for both open and laparoscopic  
3 procedures, comprising, in combination:

4 at least one fluid irrigation container;

5 at least one irrigation tubing connected to said at  
6 least one fluid irrigation container;

7 at least one valve connected to said at least one  
8 irrigation tubing for accessing irrigation fluid in said at least  
9 one fluid irrigation container;

10 means for employing a surgical device;

11 a suction tubing connected to a suction container;

12 means for suctioning fluid from within a patient  
13 through this suction tubing at the site of the surgical device  
14 wherein the suctioning means is connected to the means for  
15 employing a surgical device such that said suctioning means is  
16 activated upon activation of means for employing the surgical  
17 device; and

18 means for irrigating said irrigation fluid through the

19 irrigation tubing to a site of the surgical device wherein the  
20 means for irrigating is connected to said suctioning means such  
21 that said irrigating means is activated upon activation of said  
22 suctioning means.

1 33. The automatic fluid control system of Claim 32 further  
2 comprising an adjustment means for employing said suctioning  
3 means for a short predetermined time period beyond deactivation  
4 of said irrigation means and surgical device employment.

1 34. The automatic fluid control system of Claim 32 further  
2 comprising a flow meter sensor connected to the irrigation tubing  
3 and a suction flow meter sensor connected to the suction tubing  
4 wherein signals received from said flow meter sensor and said  
5 suction flow meter sensor are received and evaluated by a counter  
6 which in turn reports differences in fluid flow rates and fluid  
7 volume entering and exiting a patient.

1 35. The automatic fluid control system of Claim 34 wherein  
2 irrigation fluid flow and volume rates will automatically adjust  
3 to be equal to suction fluid flow and volume rates unless at  
4 least one of the irrigation fluid flow and volume rates exceeds

5 at least one of the suction fluid flow and volume rates,  
6 respectively, upon which irrigation is immediately deactivated.

1 36. The automatic suction/irrigation system of Claim 32  
2 wherein the suction and irrigation tubings are contained within,  
3 and connected to, a surgical pencil such that suction and  
4 irrigation occurs at a tip of the surgical pencil where at least  
5 one of surgical cutting and coagulation takes place.

1 37. The automatic fluid flow system of Claim 32 further  
2 comprising a fluid sensor surrounding a portion of the irrigation  
3 tubing for detecting the presence of irrigation fluid within the  
4 irrigation tubing.

1 38. The automatic fluid flow system of Claim 36 further  
2 comprising a safety relay which shuts off said irrigation means  
3 when irrigation fluid is not present in the irrigation tubing.

1 39. The automatic fluid flow system of Claim 32 wherein  
2 said suctioning means comprises at least one of an independent  
3 suctioning means and a suctioning means contained within an  
4 automatic smoke evacuator system.

1 40. The automatic fluid flow system of Claim 32 further  
2 comprising a pressure sensor connected to said irrigation tubing  
3 prior to a point of delivery within the patient.

1 41. The automatic fluid flow system of Claim 32 further  
2 comprising a vacuum sensor connected to said suction tubing which  
3 deactivates the irrigation means upon detection of a high  
4 restriction or occlusion in the suction tubing.

1 42. The automatic fluid flow system of Claim 39 further  
2 comprising a pressure controller connected to said pressure  
3 sensor which shuts off said irrigation means when fluid pressure  
4 reaches a predetermined unsafe level.

1 43. The automatic fluid flow irrigation system of Claim 32  
2 further comprising a second fluid irrigation container connected  
3 to a second irrigation tubing having a second valve for accessing  
4 irrigation fluid in the second fluid irrigation container wherein  
5 the first and second fluid irrigation container wherein the first  
6 and second irrigation tubings are connected to a "Y" connector at  
7 a point subsequent to the attachment of their respective valves

8 thereby resulting in a single irrigation conduit.

1 44. The automatic fluid flow system of Claim 41 further  
2 comprising a container controller connected to the safety relay  
3 which, upon failure to detect irrigation fluid within the first  
4 irrigation tubing by the fluid sensor, closes the valve connected  
5 to the first irrigation tubing and opens the second valve to  
6 access irrigation fluid contained within the second fluid  
7 irrigation container.

1 45. The automatic fluid flow system of Claim 42 further  
2 comprising an alarm element connected to the container controller  
3 which activates at least one of a voice and warning signal  
4 indicating that the fluid irrigation container presently in use  
5 is empty.

1 46. An improved multifunctional handpiece for performing  
2 suction and irrigation comprising:

3 an elongated hollow tubular member having an anterior  
4 end and a posterior end;

5 a suction/irrigation adaptor comprising an anterior  
6 end, a posterior end, a suction port, and an irrigation port,

7 wherein the anterior end of said suction/irrigation adaptor is  
8 connected to the posterior end of said elongated hollow tubular  
9 member; and

10 a handpiece comprising an anterior end, a posterior  
11 end, and electrical contacts for activating suctioning means and  
12 irrigation means wherein the anterior end of said handpiece is  
13 connected to the posterior end of said suction/irrigation  
14 adaptor.

1 47. The improved multifunctional hand piece of Claim 44  
2 wherein said elongated hollow tubular member further comprises a  
3 double channeled anterior having a central inter channel and a  
4 ring-shaped outer channel such that said central inner channel is  
5 connected to said suction/irrigation adaptor so that it is  
6 continuous with the irrigation port and the ring-shaped outer  
7 channel is continuous with the suction port thereby enabling the  
8 hand piece to perform suction and irrigation simultaneously.

1 48. The improved multifunctional hand piece of Claim 44  
2 further comprising a cap element for placement over the posterior  
3 end of the suction/irrigation adaptor to guard against fluid  
4 leaks.



1           49. An improved multifunctional hand piece for performing  
2 suction and irrigation in conjunction with electrosurgery and  
3 laparoscopy comprising:

4           a hand piece having an anterior end, a posterior end,  
5 and electrical contacts for activating suctioning means,  
6 irrigation means, and electrosurgery means;

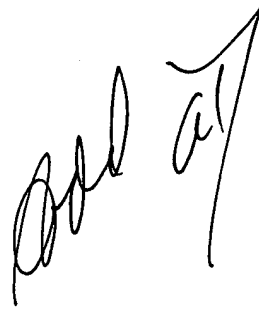
7           an electrosurgical connector having an anterior end and  
8 a posterior end wherein the posterior end of said electrosurgical  
9 connector is connected to the anterior end of said hand piece;

10          a suction/irrigation adaptor comprising an anterior  
11 end, a posterior end, a suction port, and an irrigation port,  
12 wherein the posterior end of said suction/irrigation adaptor is  
13 connected to the anterior end of said electrosurgical connector;

14          a double channeled suction/irrigation tubular member  
15 having an anterior end and a posterior end wherein the posterior  
16 end of said double channeled suction/irrigation tubular member is  
17 connected to the anterior end of said suction/irrigation adaptor;  
18 and

19          an electrode connected to said electrosurgical  
20 connector such that the electrode extends through channels  
21 contained within the electrosurgical connector, the

22 suction/irrigation adaptor, and the double channeled  
23 suction/irrigation tubular member wherein the end of said  
24 electrode extends beyond the anterior end of said double  
25 channeled suction/irrigation tubular member.

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